WHAT IS CLAIMED IS:

1. A position detection method for detecting the position of an object upon receiving light from a plurality of position detection marks on the object,

5 comprising:

an image information acquisition step of obtaining image information of every position detection mark from the light that has been received;

a position information calculation step, which

10 has a plurality of calculation processes, of calculating position information of every position detection mark from the image information using a prescribed calculation process among the plurality of calculation processes;

15 an error information calculation step of calculating information representing an error of a position detection mark, which corresponds to each item of the position information, with respect to a reference position;

20 a residual-error information calculation step of calculating information representing a residual error that is the result of eliminating a prescribed error component from the information representing the error;

a storage step of obtaining, for each item of the

25 position information, a calculation process, from among the plurality of calculation processes, for calculating pertinent position information that will

minimize the residual error, and storing a combination
of this position information and calculation process
that corresponds thereto; and

a position detection step of detecting the
5   position of the object using information representing
an error calculated based upon the combination of the
position information and the calculation process that
corresponds thereto.

2.   The method according to claim 1, wherein if x and
10   y directions are taken as mutually orthogonal
directions having the reference position as the origin
thereof, the information representing the error is
represented, as a deviation in the position of the
position detection mark from the reference position,
15   by shift Sx in the x direction, shift Sy in the y

direction, inclination θx with respect to the x axis,

inclination θy with respect to the y axis,

magnification Bx along the x direction and

magnification By along the y direction, and the
20   prescribed error component is obtained in accordance
with the following equation:

$$D'i = \begin{pmatrix} Bx & -\theta y \\ \theta x & By \end{pmatrix} Di + \begin{pmatrix} Sx \\ Sy \end{pmatrix}$$

3.   The method according to claim 1, wherein said
storage step obtains a calculation process for which
25   the mean sum of the squares of the residual error will
be minimized.

4. The method according to claim 1, wherein the plurality of calculation processes calculate the position information by matching image information with a template that exhibits maximum correlation from
5 among a plurality of different templates.

5. The method according to claim 4, wherein the image information includes image information having two minimal values conforming to both ends of a position detection mark and image information having a minimal
10 value only in the vicinity of the center of the single position detection mark, a template conforming to each item of image information being provided.

6. The method according to claim 1, wherein the template has a plurality of templates having symmetry
15 in relation to direction in which the position detection mark is detected.

7. The method according to claim 1, wherein the calculation processes include any two or more of a method of matching image information with the
20 template, a method of calculating position information from centroid-position information of pixels in the image information, and a method of calculating position information from a differential value of the image information.

25 8. A position detection apparatus for detecting the position of an object upon receiving light from a plurality of position detection marks on the object,

comprising:

an image information acquisition unit for obtaining image information of every position detection mark from the light that has been received;

5   a position information calculation unit, which has a plurality of calculation processes, for calculating position information of every position detection mark from the image information using a prescribed calculation process among the plurality of

10   calculation processes;

an error information calculation unit for calculating information representing an error of a position detection mark, which corresponds to each item of the position information, with respect to a

15   reference position;

a residual-error information calculation unit for calculating information representing a residual error that is the result of eliminating a prescribed error component from the information representing the error;

20   a storage unit for finding, for each item of the position information, a calculation process, from among the plurality of calculation processes, for calculating pertinent position information that will minimize the residual error, and storing a combination

25   of this position information and calculation process that corresponds thereto; and

a position detection unit for detecting the

position of the object using information representing

an error calculated based upon the combination of the

position information and the calculation process that

corresponds thereto.

5   9. An exposure apparatus having a stage device driven

in order to position the object based upon position

information detected by the position detection

apparatus set forth in claim 8;

      said stage device positioning a substrate or a

10   reticle or both as the object.